

# OMA, IPSO & IETF CoRE



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OMA F2F - Warsaw



# Standards built on each other

## IoT Standards That Build On Each Other

2014

- CoAP and related standards from IETF
  - REST API for constrained networks and devices
  - HTTP Proxy provides abstraction through standard web APIs
  - Core-link-format (RFC 6690) provides semantic descriptors in the form of web links
  - Resource Directory provides an API for scalable discovery and linking using core link-format mediatype
- OMA LWM2M is based on CoAP
  - Provides a server profile for IoT middleware
  - Defines a simple reusable object model
  - Defines management objects and reuses REST API for onboarding and device life cycle management
- IPSO Smart Objects are based on OMA LWM2M
  - Defines application objects using the LWM2M Object Model
  - Complex objects can be composed from simple objects
  - Easy to add new resource and object types as needed

# IPSO Smart Objects

- Based on the LWM2M Object Model but for Application Data.
- Domain-specific objects created by vendors themselves.
- Provides a consistent Design Pattern and Reusable Resource Definitions.
- Non-mandatory resources can be modified, new Objects can easily be added and automatically validated.
- Released Objects are registered in OMNA and use the standard OMA DDF (XML) object descriptors.
- 53 Objects (temperature, ... stopwatch), registered with OMNA and 100 Reusable Resources.
- Openly available and easy to contribute: <http://ipso-alliance.github.io/pub>

# IPSO Smart Objects

- Object representation as in LWM2M

`<object ID>/<object instance ID>/<resource ID>`

- URI

`coap://device1.example.com/3303/0/5700`

`3300` -> Temperature Sensor

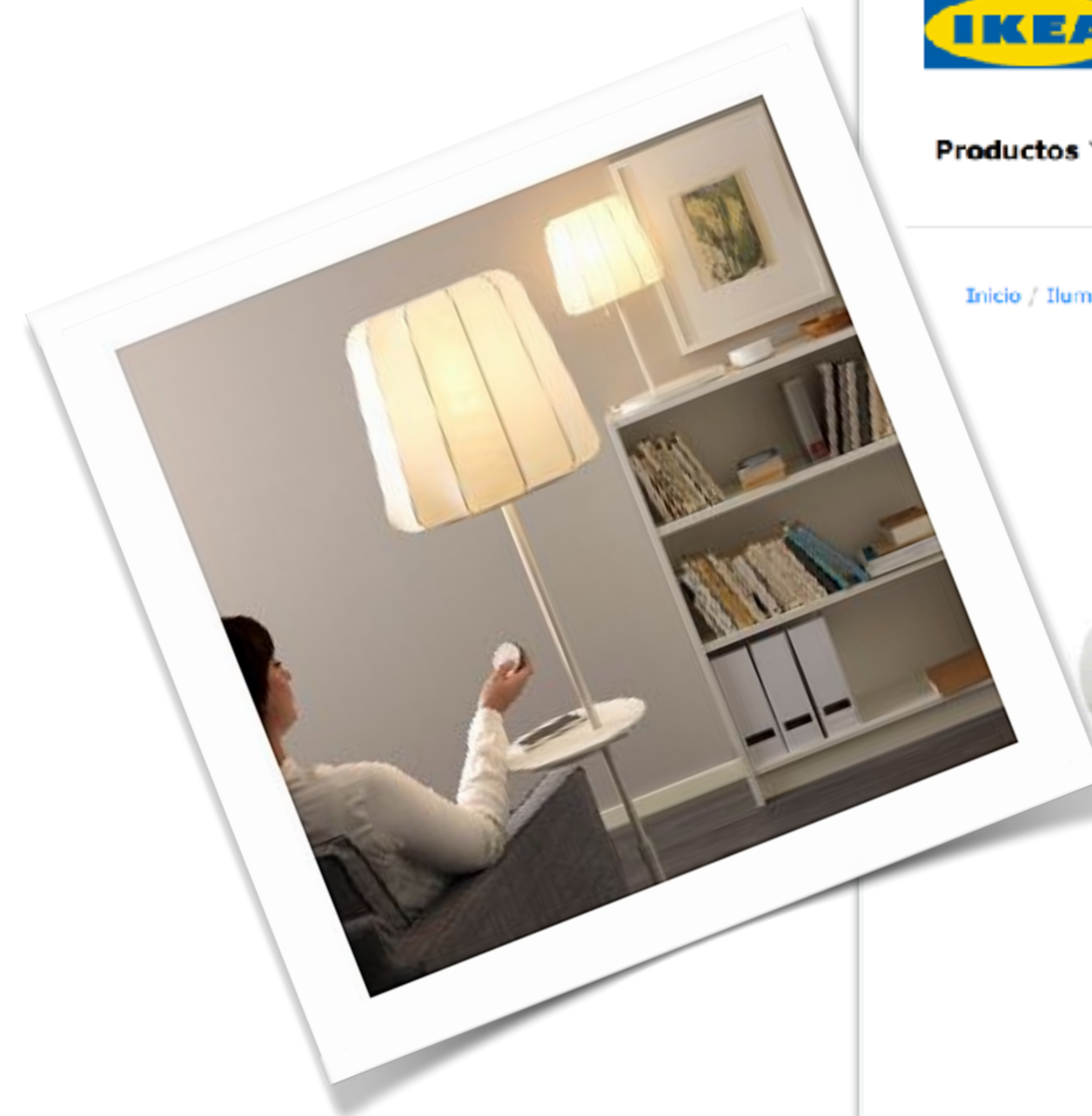
`0` -> instance 0 of a Temperature Sensor


`5700` -> resource having the current value or a most recent reading

- Implemented in Wakaama, Leshan, Contiki, LWMQN, BIPSO and products that use LWM2M.




# IKEA TRÅDFRI





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### TRÅDFRI

Kit entrada, espectro blanco, blanco

**€ 79,99** / ud

(€ 65,11 Sin IVA)

[Ficha del producto](#)

*IVA incluido*

Referencia artículo: 803.389.50

El kit TRÅDFRI incluye una pasarela, un mando a distancia y dos bombillas led E27 (casquillo grande) de espectro blanco para ponértelo fácil.

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# IETF and IoT Work

- IETF's role: Specify the underlying, fundamental Internet Technologies.
- “Permissionless innovation” - so that others can build on top.

Run <IoT transfer protocol> over IP	Security for IoT (ACE, COSE)
Routing for lossy & low power networks	Thing-to-Thing communication (IRTF)
Web technology for IoT (CoRE)	Architectural oversight (IAB)



# IETF CoRE WG

- 12 documents that are WG items.
- Highly relevant for LWM2M.
- Addressing CoAP protocol, security, linking, discovery, congestion control, data serialisation, modelling in YANG, HTTP Proxying, Publish-Subscribe...
- Some of them recently updated like Resource Directory or CoAP over TCP.
- More drafts on the pipeline ...

<a href="#">draft-ietf-core-coap-pubsub</a>	<a href="#">-02</a>	2017-07-03	<a href="#">Active</a>	
<a href="#">draft-ietf-core-comi</a>	<a href="#">-01</a>	2017-07-18	<a href="#">Active</a>	
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<a href="#">draft-ietf-core-cocoa</a>	<a href="#">-01</a>	2017-03-13	<a href="#">Expired</a>	
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<a href="#">draft-ietf-core-block</a>	<a href="#">-21</a>	2016-07-08	<a href="#">RFC 7959</a>	
<a href="#">draft-ietf-core-coap</a>	<a href="#">-18</a>	2013-06-28	<a href="#">RFC 7252</a>	<a href="#">(RFC 7959)</a>
<a href="#">draft-ietf-core-etch</a>	<a href="#">-04</a>	2016-11-14	<a href="#">RFC 8132</a>	
<a href="#">draft-ietf-core-groupcomm</a>	<a href="#">-25</a>	2014-09-12	<a href="#">RFC 7390</a>	
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<a href="#">draft-ietf-core-observe</a>	<a href="#">-16</a>	2014-12-30	<a href="#">RFC 7641</a>	



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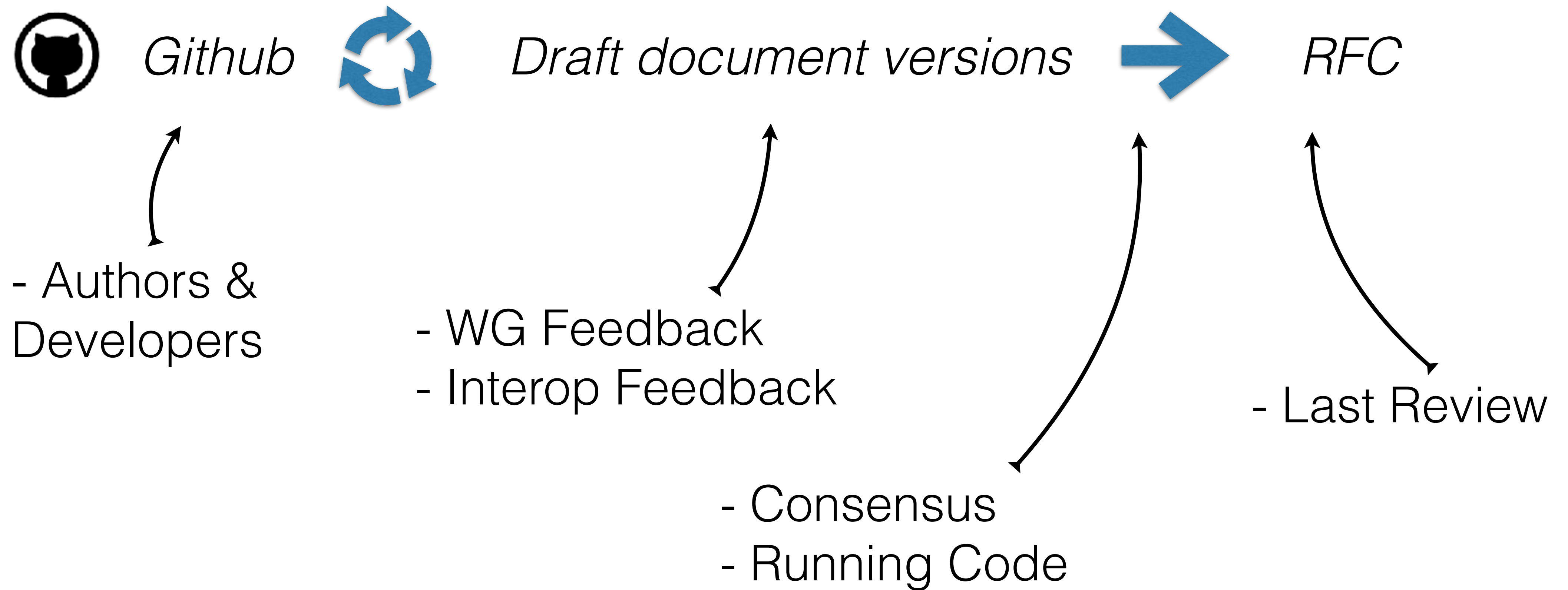


# Possible LWM2M Additions



- *[RFC7252]* Support of PATCH/FETCH methods, it'd be greatly beneficial for firmware upgrade or observing relatively large sets of resources.
- *[RFC7641]* Support of observe between LWM2M Clients in order to subscribe to updates from one another.
- *[RFC8075]* In cases of GWs that need to implement a HTTP to CoAP proxy.
- *[I-D.ietf-core-coap-tcp-tls]* **(new)** outlines the changes required to use CoAP over TCP, TLS, and WebSockets transports.
- *[I-D.ietf-core-resource-directory]* **(new)** Other than traditional LWM2M, CoAP's in-built discovery would be beneficial to support device-to-device cases. New version just published, <https://tools.ietf.org/html/draft-ietf-core-resource-directory-12>
- *[I-D.ietf-core-object-security]* **(new)** For systems in which endpoints work behind a gateway or use LWM2M for managing the gateways, it might be good to implement other types of cryptographic protection than TLS/DTLS.

# Ways of Working





# Assorted References

REST	<a href="https://www.ics.uci.edu/~fielding/pubs/dissertation/rest_arch_style.htm">https://www.ics.uci.edu/~fielding/pubs/dissertation/rest_arch_style.htm</a>
CoAP	<a href="https://tools.ietf.org/html/rfc7252">https://tools.ietf.org/html/rfc7252</a>
CoRE Link-Format	<a href="https://tools.ietf.org/html/rfc6690">https://tools.ietf.org/html/rfc6690</a>
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CoRE RD	<a href="https://datatracker.ietf.org/doc/draft-ietf-core-resource-directory/">https://datatracker.ietf.org/doc/draft-ietf-core-resource-directory/</a>
LWM2M	<a href="https://github.com/OpenMobileAlliance/">https://github.com/OpenMobileAlliance/</a>
CoMI	<a href="https://tools.ietf.org/wg/core/draft-ietf-core-yang-cbor/">https://tools.ietf.org/wg/core/draft-ietf-core-yang-cbor/</a>
WISHI	<a href="https://wishi.space">https://wishi.space</a>
CoAP TCP+TLS	<a href="https://tools.ietf.org/wg/core/draft-ietf-core-coap-tcp-tls/">https://tools.ietf.org/wg/core/draft-ietf-core-coap-tcp-tls/</a>
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